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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.                 | CONFIRMATION NO.       |
|--|-------------|----------------------|-------------------------------------|------------------------|
| 10/691,555   | 10/24/2003  | David C. Lovetro     | ANO 6468 US1/3263 CIP               | 7490                   |
| 27624  | 7590        | 01/17/2008           |                                     |                        |
| AKZO NOBEL INC.<br>INTELLECTUAL PROPERTY DEPARTMENT<br>120 WHITE PLAINS ROAD 3RD FLOOR<br>TARRTOWN, NY 10591 |             |                      | EXAMINER<br>CARRILLO, BIBI SHARIDAN |                        |
|  |             |                      | ART UNIT<br>1792                    | PAPER NUMBER           |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/691,555

Applicant(s)

LOVETRO ET AL.

Examiner

Sharidan Carrillo

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-3, 8-12, 17, 18, 20, 23 and 24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-12, 17-18, 20, and 23-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 1/8/08
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. Claims 23 and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The limitations of contacting the metal with said solution for a time sufficient to effect cleaning and less than an amount of time to effect etching constitutes new matter, not supported by the specification as originally filed. Page 3, lines 23-24 of the instant specification teach that in the cleaning process of the invention only small amounts of metal is dissolved. Page 3, line 23 states that with etching amounts of metal are dissolved. Based on page 3, lines 23-24, the instant specification teaches that during the cleaning process, etching occurs which results in the metal being dissolved. The specification does not teach a solution which effects cleaning and less than an amount of time of effect etching. The specification does not teach or suggest the amount of time to effect cleaning or the amount of time to effect etching. Therefore, the limitations of claim 23 constitute new matter.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-3, 8-12, 17-20, and 23-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite for the following reasons. Claim 1 recites "wherein said cleaning solution comprises from about 0.5 to about 20% weight hydrogen peroxide". It is unclear whether "0.5 to about 20% weight hydrogen peroxide" refers to a) the "stabilized hydrogen peroxide solution" or b) the hydrogen peroxide in the stabilized hydrogen peroxide solution". If applicant intends the 0.5 to about 20% hydrogen peroxide to refer to the hydrogen peroxide in the "stabilized hydrogen peroxide solution", the above claim language would be indefinite since 0.5 to about 20% is outside of the range of "about 20 to about 70% hydrogen peroxide". Claim 1 is further indefinite because "said metal via" lacks positive antecedent basis. The examiner also suggests amending any reference to "said cleaning solution" to "said aqueous cleaning solution", as recited in claims 1, 10, 11.

Claim 23 is indefinite because it is unclear what one would consider as a time which is sufficient to effect cleaning but less than a time to effect etching. Additionally, it is unclear what is being etched. Additionally, how is the cleaning and etching effected. Specifically, how much is being etched or cleaned? What does applicant mean by "effect cleaning and effect etching"?

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-3, 8, 12, 17-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brasch (43782270) in view of applicant's admission of the prior art, <sup>B'sc</sup> <sub>12/17/07</sub> or McDonogh (5364549) or Jadesjo (EP0845526).

In reference to claims 1-2 and 12, Brasch teaches a method of etching copper from a circuit board by contacting with an aqueous solution comprising hydrogen peroxide, at least one mineral acid (sulfuric acid) and 0.1-20% by weight phosphonic acid (col. 3, lines 25-30, col. 4, lines 17-20, col. 2, lines 35-40). In reference to cleaning metals, the limitations are met since Brasch is performing the same step of contacting the metal with the claimed composition. Additionally, since "etching" and "cleaning" are equivalent terms, the limitations are met since during the etching of the copper metal, contaminants are removed from the copper surface. In reference to claim 2, refer to col. 3, lines 25-30.

Brasch fails to teach diluting a concentrated hydrogen peroxide solution (20-70%) in order to formulate an aqueous cleaning solution comprising 0.5 to about 20 weight percent hydrogen peroxide. Applicant's specification, page 1, lines 5-13 teaches that it is well known and conventional in the art to dilute concentrated hydrogen peroxide solutions, containing from about 30 to about 80% by weight hydrogen peroxide to form diluted solutions having concentration ranging from 0.1 to about 20% weight percent hydrogen peroxide for practical commercial applications. It would have been within the level of the skilled artisan to have diluted the concentrated hydrogen peroxide solution of Brasch, to form a solution comprising 0.1 to 20% by weight hydrogen peroxide, as taught by applicant's admission of the prior art, since it is well known and

conventional in the art to use diluted hydrogen peroxide solutions for various applications including bleaching, cleaning, etching, disinfection, and sterilization.

Brasch fails to teach diluting a concentrated hydrogen peroxide solution (20-70%) in order to formulate an aqueous cleaning solution comprising 0.5 to about 20 weight percent hydrogen peroxide. Jadesjo teaches a hydrogen peroxide solution for cleaning. In col. 4, lines 40-55, Jadesjo teaches that it is conventional in the art to dilute a concentrated solution of hydrogen peroxide prior to use. Specifically, Jadesjo teaches a concentrated hydrogen peroxide having a concentration within the range of 10-60% by weight and forming a ready to use solution having a concentration of between about 0.1 to 10% by weight hydrogen peroxide (col. 5, lines 5-10). It would have been within the level of the skilled artisan to have diluted the concentrated hydrogen peroxide solution of Brasch, to form a diluted solution, as taught by Jadesjo, since it is well known and conventional in the art to use diluted hydrogen peroxide solutions for cleaning purposes prior to use. Furthermore, as noted by the examiner, the Jadesjo reference was provided by applicant in the communication of 10/24/03 and considered and acknowledged by the examiner on 7/21/04.

Brasch fails to teach diluting a concentrated hydrogen peroxide solution (20-70%) in order to formulate an aqueous cleaning solution comprising 0.5 to about 20 weight percent hydrogen peroxide. McDonogh teaches hydrogen peroxide solutions for use in metal surface treatments. In col. 4, lines 44-65, McDonogh teaches that it is conventional in the art to dilute a concentrated solution of hydrogen peroxide prior to use. Specifically, McDonogh teaches a commercially concentrated hydrogen peroxide

having a concentration within the range of 35-70% by weight and forming a ready to use solution having a concentration of between about 1 to 10% by weight hydrogen peroxide (col. 4, lines 44-65). It would have been within the level of the skilled artisan to have diluted the concentrated hydrogen peroxide solution of Brasch, to form a diluted solution, as taught by McDonogh, since it is well known and conventional in the art to use diluted hydrogen peroxide solutions for treatment of metal surfaces prior to use.

In reference to claim 3, Brasch fail to teach 35-45% of phosphonic acids. However, it would have been within the level of the skilled artisan to adjust the concentration of phosphonic acid since Brasch teaches that higher concentrations can be used (col. 3, lines 25-30). Additionally, it is well known in the art that higher concentrations of stabilizer are required for dilute solutions of hydrogen peroxide, as evidenced by Christiansen (4614646, col. 7, lines 54-62). Therefore, given that Brasch in view of the secondary references teach dilution of the hydrogen peroxide and since it is well known in the art that diluted solutions of hydrogen peroxide require higher concentrations of stabilizer, it would have been well within the level of the skilled artisan to increase the concentration level of phosphonic acid present in the hydrogen peroxide solution of Brasch in order to effectively stabilize and prevention decomposition of the hydrogen peroxide solution. Re claims 17-18 and 20, Brasch fails to teach the pH of less than 7. One would have reasonably expected the pH of the composition to be less than 7 since the pH is a chemical property of the composition and Brasch teaches the same composition as the instantly claimed invention. Additionally, one would have reasonably expected the pH of the composition to be less than 7 since the prior art



teaches that compositions comprising hydrogen peroxide, surfactant, and phosphonic acid having pHs of less than 7 (Jadesjo et al., 5885953). In reference to claim 8, refer to col. 2, line 30.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brasch (4378270) in view of) in view of applicant's admission of the prior art, McDonogh<sup>OR</sup> (5364549) or Jadesjo (EP0845526), as applied to claims 1-3, 8, 12, 17-18, and 20, as described in paragraph 6 above, and further in view of Schellinger Jr. (4401509). BSC  
12/17/07

Brasch teaches the invention substantially as claimed with the exception of the concentration of sulfuric acid. Schellinger teaches a composition for etching copper from circuit boards using sulfuric acid, hydrogen peroxide, and phosphonic acid. In col. 3, lines 3-5, Schellinger teaches 2-20% sulfuric acid. Schellinger further teaches that the concentration of sulfuric acid is not critical.

It would have been obvious to a person of ordinary skill in the art to have modified the method of Brasch to include adjusting the concentration of sulfuric acid to 2-20%, as taught by Schellinger, for purposes of etching copper from integrated circuit boards.

8. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brasch (4378270) in view of applicant's admission of the prior art, McDonogh<sup>OR</sup> (5364549) or Jadesjo (EP0845526), as applied to claims 1-3, 8, 12, 17-18, and 20, as described in paragraph 6 above, and further view of Sugihara et al. (5705089). BSC  
12/17/07

In reference to claims 10-11, and 15, Brasch teaches the invention substantially as claimed with the exception of the surfactant. Sugihara teaches an acidic or basic solution comprising hydrogen peroxide, surfactant, sulfuric acid, and phosphonic acid for cleaning semiconductor substrates in order to remove metallic contaminants. In col. 3, lines 60-65, Sugihara teaches a nonionic surfactant as a wetting agent for purposes of enhancing removal of contaminants from the substrate surface. It would have been obvious to a person of ordinary skill in the art to modify the method of Brasch to include nonionic surfactants of Sugihara, as a wetting agent, for purposes of enhancing removal of contaminants from the substrate surface.

9. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brasch (43782270) in view of Cooper et al. (6063205).

In reference to claim 23, Brasch teaches a method of etching copper from a circuit board by contacting with an aqueous solution comprising hydrogen peroxide, at least one mineral acid (sulfuric acid) and 0.1-20% by weight phosphonic acid (col. 3, lines 25-30, col. 4, lines 17-20, col. 2, lines 35-40). In reference to step b of claim 23 and in view of the indefiniteness with respect to the time and what is being etched, the limitations are met by Brasch. In reference to cleaning metals, the limitations are met since Brasch is performing the same step of contacting the metal with the claimed composition. Additionally, since "etching" and "cleaning" are equivalent terms, the limitations are met since during the etching of the copper metal, contaminants are removed from the copper surface. Brasch fails to teach the claimed concentration of

hydrogen peroxide. However, in col. 4, lines 19-20, Brasch teaches that lower concentrations of hydrogen peroxide can be employed. In reference to claim 8, refer to col. 2, line 30. Brasch fails to teach passivating the metal by contacting with the hydrogen peroxide solution. However, one would have reasonably expected passivating to occur since Brasch is performing the same step of contacting the metal with the claimed composition. Alternatively, it is well known in the art, as evidenced by Cooper et al., that treating a surface (i.e. semiconductor wafer) with hydrogen peroxide results in both cleaning of the surface and passivation of the substrate surface (col. 3, lines 35-40). Therefore, given the teachings of Cooper et al., one would have reasonably expected the step of contacting the surface with hydrogen peroxide solution to also result in passivation of the substrate surface since Cooper et al. teach hydrogen peroxide as a cleaning and passivating agent. Additionally, it is well known and conventional in the art to clean contaminants from the substrate surface and passivate the surface using hydrogen peroxide (Chai et al., 5837662).

### ***Response to Arguments***

10. The rejections of the claims as being unpatentable over Sugihara et al. in view of the secondary references are withdrawn in view of the new amended claims.
11. The rejections of the claims as being unpatentable over Brasch in view of the secondary references are maintained for the reasons cited above.
12. Applicant argues that the 1.132 Declaration of Lovetro et al. provides a showing of unexpected results. Specifically, applicant argues that the 1.132 Declaration shows

unexpected stability characteristics due to the presence of HEDP additive in relatively high amounts. Applicant's arguments are unpersuasive for the following reasons:

a) The 1.132 declaration submitted is not proper for this instant application since it is in response to the Final Office Action of Application 10/301760.

b) The 10/301760 application is not even related to the instant application in question.

c) The Declaration refers to references cited, namely the Ramirez and the Brasch. The examiner has not relied upon the Ramirez reference for rejecting any of the claims of the instant application.

d) The Declaration does not address the prior art of Sugihara et al., which is used to reject claims 23-24.

e) The Declaration is not commensurate in scope with the instantly claimed invention. The Declaration shows applicant's invention using 7.9% HEDP, however, applicant's claims are directed to about 10 to about 60 weight % HEDP. Therefore, applicant's declaration is not commensurate in scope with the instantly claimed invention. Furthermore, applicant's declaration is not commensurate in scope with applicant's arguments that unexpected stability is achieved using higher levels of HEDP with higher concentration levels of hydrogen peroxide. The declaration does not show varying levels of HEDP with increasing concentrations of hydrogen peroxide and the effect on stability of the hydrogen peroxide. Clearly, 7.9% is not a high concentration of HEDP. Additionally, the declaration does not compare the prior art of Brasch with

applicant's invention. Even if the Declaration was commensurate in scope with the instantly claimed invention, the declaration would not be persuasive for the following reasons. Clearly, Brasch teaches that it is well within the level of the skilled artisan to adjust the concentration of the organophosphonic acids. Brasch further teaches the phosphonic acids within the range of 0.1% to 20% by weight, which clearly falls with the claimed range and the concentration recited in the Declaration. Additionally, it is well known in the art that higher concentrations of stabilizer are required for dilute solutions of hydrogen peroxide, as evidenced by Christiansen (4614646, col. 7, lines 54-62). Therefore, given that Brasch in view of the secondary references teach dilution of the hydrogen peroxide and since it is well known in the art that diluted solutions of hydrogen peroxide require higher concentrations of stabilizer, it would have been well within the level of the skilled artisan to increase the concentration level of phosphonic acid present in the hydrogen peroxide solution of Brasch in order to effectively stabilize and prevent decomposition of the hydrogen peroxide solution.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharidan Carrillo whose telephone number is 571-272-1297. The examiner can normally be reached on M-W 6:30-4:00pm, alternating Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Sharidan Carrillo  
Primary Examiner  
Art Unit 1792

bsc



SHARIDAN CARRILLO  
PRIMARY EXAMINER